UNITED STATES PATENT APPLICATION
FOR

SERVICE REQUEST COMMON OBJECT

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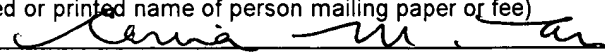EXPRESS MAIL CERTIFICATE OF MAILING

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SERVICE REQUEST COMMON OBJECT

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims the benefit of U.S. Provisional Patent Application No. 60/457,305 filed March 24, 2003, entitled, "SERVICE REQUEST COMMON OBJECT," by Barnes et al., and which is hereby incorporated by reference in its entirety.

TECHNICAL FIELD

[0002] The present invention is directed to the field of data modeling in the context of enterprise resources planning and customer relations management, and more specifically to service request management.

BACKGROUND

[0003] Many enterprise systems use call centers to interface with customers. Such call centers may use call center business processes to process customer requests. An example of a customer request is a request for service or "service request".

[0004] For example, assume that a customer calls to report a loss of service. A loss of service is also referred to herein as a network outage. Call center agents face a challenge to manage customer service requests and the network outages in the shortest amount of time. The call center is referred to as the front-office.

[0005] Typically, network outages are managed by a network operations center (NOC). The network operations center is referred to as the back-office. Further, the individuals who act as call center agents are distinct from the individuals in the network operations center. The two groups typically do not communicate with each

other. In addition, the call center and the network operations center, each use different applications. For example, the call center agents use a call center application in the call center's computerized system to record customer technical problems as service requests. On the other hand, the network operations center uses technical applications such as a network management system in the network operations' computerized system to detect and fix problems such as network outages.

[0006] Typically, the call center applications are not linked to the network management systems. Although the network management system can detect and recognize a network outage, such information is usually not communicated to the call center agents and the call center applications. Therefore, when a customer contacts the call center to report a loss of service, the call center is usually not aware of the network outage. In response to a customer's complaint regarding the network outage, the call center agent collects the network outage information as a ticket and sends the ticket to the appropriate individuals to resolve the ticket.

[0007] Thus, a mechanism is needed to synchronize the information associated with service requests and network outages between the front-office applications, e.g., the call center applications, with the back office applications, e.g., the network management system applications.

[0008] Generally, in order for front-office computerized systems to communicate with back-office computerized systems or vice versa, the user must manually regenerate

data from the back-office computerized systems in forms usable by the front-office computerized systems, and vice versa. Such manual regeneration has several significant disadvantages, including: (1) it is often expensive; (2) it often requires a substantial amount of time to complete; (3) it must be repeated each time data changes in either the back-office system or the front-office system; and (4) it is prone to errors.

[0009] In view of the foregoing, an automated approach for synchronizing data used by a back-office computerized system with data that is use by a front-office computerized system, and vice versa, is needed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] FIG. 1A is a high level network diagram showing aspects of a computerized environment in which the facility operates, according to certain embodiments.

[0011] FIG. 1B is a block diagram showing some of the components typically incorporated in at least some of the computer systems and other devices on which the facility executes.

[0012] FIG. 2 is a high level flow diagram that shows some steps typically performed by the facility in order to convert service request information from the one or more source formats to the target format.

[0013] FIG. 3A illustrates some a process flow for fulfilling a service request.

[0014] FIG. 3B illustrates a process flow for an online self-service to obtain service requests.

[0015]   FIG. 4 illustrates an integration business process (IBP) for Synchronizing service request information between the source and target systems.

[0016]   FIG. 5 to FIG. 17 are data structure diagrams of the service request common object model.

DETAILED DESCRIPTION

[0017]   When a customer contacts the call center to report a loss of service, the call center is usually not aware of the network outage because the call center applications are not linked to the network management systems. Although the network management system can detect and recognize a network outage, such information is usually not communicated to the call center agents and the call center applications. A more proactive method would be to synchronize the service request information and network outage information by linking the network management system applications to the call center applications.

[0018]   The synchronization operation provides users associated with the call center and network operations the same view of customer service requests and network outage information across the various computer applications. All changes in the customer service requests and the network outage information need to be captured and made accessible to all relevant computer applications in the enterprise system. The computer applications of the front-office system uses a data model that is distinct from the data model used in back-office system's computer applications. Thus, a common data storage model is needed so that the various computer

applications across the enterprise system can share the service request information and network outage information.

[0019]   According to certain embodiments, the front-office applications such as the call center applications can be linked to the back-office applications such as the network operations applications by using a data model that includes a service request common object.

[0020]   If the network management system applications are linked to the call center applications using a service request common object, then when a network outage occurs, the network management system can communicate with the call center. For example, the network management system can request that a service request be opened in the call center application. If a customer calls to report the network outage, the call center agent would be able to verify the customer's outage and report the current activity on the opened service request.

[0021]   Call centers may use certain call center business processes to process customer requests. Such call center business processes may enable a call center agent to perform the following:

1) initiate or create a service request in a multi-application integration system (MAIS);

2) capture the details of the service request

3) verify entitlements;

4) research and resolve the service request;

5) escalate service requests (if necessary);

6) create customer orders (if necessary); and

7) close service request.

[0022] A software facility (hereafter "the facility") for automatically synchronizing service request information, is described. In some embodiments, the facility converts service request information from a form used by the source system to a form used by the target system. In certain embodiments, source systems may be front-office systems such as customer call centers. In certain embodiments, target systems may be back-office system providing support for network operations. However, the network operations center may need to initiate service request information, then the network operations center is referred to as the source system and the call center becomes the target system.

[0023] In some embodiments, such as embodiments adapted to converting service request information in the first source format, the facility converts service request information by converting the service request information that is in the first source format into an intermediate format. The intermediate format is then used to convert the service request information into the target format.

[0024] By performing such conversions, embodiments of the facility enable a user of a first computerized system who has stored service request information in a first format for use by the first computerized system to readily make the stored service request information available for use in a second computerized system that utilizes a second format in a cost-efficient and time-efficient manner.

[0025]   FIG. 1A is a network diagram showing aspects of a typical hardware environment in which the facility operates. FIG. 1A shows a source system 110, a target system 130, an integration server 120 and a network 150. Source system 110 stores service request information in a source format. There may be more than one source system. Target system 130 stores service request information in a target format. Target system 130 is described in greater detail herein, with reference to FIG. 1B.

[0026]   The facility (not shown) converts some or all service request information that is in the source format into the target format by using an intermediate format of the service request information. In certain embodiments, such conversions are performed with the aid of one or more other computer systems, such as integration server system 120. Components of the facility may reside on and/or execute on any combination of these computer systems, and intermediate results from the conversion may similarly reside on any combination of these computer systems.

[0027]   The computer systems shown in FIG. 1A are connected via network 150, which may use a variety of different networking technologies, including wired, guided or line-of-sight optical, and radio frequency networking. In some embodiments, the network includes the public switched telephone network. Network connections established via the network may be fully-persistent, session-based, or intermittent, such as packet-based. While the facility typically operates in an environment such as is shown in FIG. 1A and described above, those skilled in

the art will appreciate the facility may also operate in a wide variety of other environments.

[0028]   FIG. 1B is a block diagram showing some of the components typically incorporated in at least some of the computer systems and other devices on which the facility executes, including some or all of the server and client computer systems shown in FIG. 1A. These computer systems and devices 100 may include one or more central processing units ("CPUs") 101 for executing computer programs; a computer memory 102 for storing programs and data -- including data structures -- while they are being used; a persistent storage device 103, such as a hard drive, for persistently storing programs and data; a computer-readable media drive 104, such as a CD-ROM drive, for reading programs and data stored on a computer-readable medium; and a network connection 105 for connecting the computer system to other computer systems, such as via the Internet, to exchange programs and/or data -- including data structures. While computer systems configured as described above are typically used to support the operation of the facility, those skilled in the art will appreciate that the facility may be implemented using devices of various types and configurations, and having various components.

[0029]   It will be understood by those skilled in the art that the facility may transform service request information from a number of different source systems and from a number of different source software packages to a number of target systems and/or to a number of target software packages.

[0030]   FIG. 2 is a high level flow diagram that shows some steps typically performed by the facility in order to convert service request information from the one or more source formats to the target format. At block 201, the facility extracts service request information from one or more source systems. At block 202, the facility converts the extracted information into an intermediate format. The intermediate format is described in greater detail herein, with reference to the common object data model. At block 203, the facility synchronizes the service request information from the source system with that of the target system by converting the service request information in intermediate format into the target format. After block 203, the steps as shown in FIG. 2 conclude.

[0031]   The steps shown in FIG. 2 may be repeated periodically, either to convert service request information that is changed in the source system since the last conversion, and/or to convert one or more particularly selected service request information. The facility may perform conversions from various source systems on which is executing various source software packages, and/or convert service request information to various target systems executing different target software packages.

[0032]   Efficiency of the service request capture and resolution may be measured with the following indicators: 1) number of service requests (by area, by customer, by severity, by source, etc.), 2) open service requests by time to resolve, by owner, by account, by age, etc., 3) number of closed service requests by time to resolve, by account, by area, by time period (month, week, day), etc.

[0033]   FIG. 3A illustrates some a process flow for fulfilling a service request. At block 302, the customer reports a service issue to a customer service representative over the phone. The customer service representative identifies the customer and inquires if the call is regarding a new or existing issue. a customer service representative investigates a service request in response to a customer calling into the call center. If the customer is new, then a new contact is created for the customer before proceeding with the call.

[0034]   At block 304, the customer service representative issues queries to see if there are any existing open service requests for this customer. If the service issue is related to an existing service request then the customer service representative provides status to the customer and updates the service request with any new information provided by the customer. If the service issue is not related to any service request, then a new service request is created and all details are entered for this new service request.

[0035]   At block 306, the customer service representative verifies if the customer is entitled to receive the service associated with the service request. If the customer is not entitled to receive service, then the agent informs the customer about the same and transfers the call to a sales order agent to order a service agreement.

[0036]   At block 308, if the customer is entitled, then the customer service representative either takes ownership of the service request or assigns the service request to the appropriate person who can work on the service request.

[0037]   At block 310, the customer service representative researches the service request and attempts to resolve the service request. At block 312, the customer service representative determines whether the customer is satisfied with the resolution of the service request. If the customer is not satisfied with the solution, or if the issue is not resolved within the commit time, then at block 314, the customer service representative attempts to escalate the service request by contacting the appropriate departments. If it is determined that the customer is satisfied, then at block 316, the customer service representative determines whether the resolution of the service request requires delivery of parts to the customer. If it is determined that parts are to be delivered, then at block 318, the customer service representative creates an order for the needed parts. Otherwise, if parts are not needed then at block 320, the service request is completed.

[0038]   FIG. 3B illustrates a process flow for an online self-service to obtain service requests. An online self-service business process enables customers and partners to create, update, track, and sometimes resolve their service requests online. At block 350, the customer logs into the self-service web site. At block 352, the customer either submits a new service request or updates an existing service request.

[0039]   At block 354, for an existing service request the customer queries for the service request, checks the status, and updates the service request with new information. At block 356, the updated information is sent to the MAIS to update the

corresponding service request.

[0040]   At block 358, for a new service request the customer creates a service request and fills in the details. At block 360, the new service request information is sent to the MAIS to create the service request.

[0041]   FIG. 4 illustrates an integration business process (IBP) for Synchronizing service request information between the source and target systems. At block 402, when a customer calls about a new service issue, the customer service representative captures the details of the service issue by creating a new service request. At block 404, this service request information is used to create a service request object that is referred to by both the source and target systems using the synchronization service request process. During the course of resolution of a service request, the service request information undergoes several modifications including addition of new activities, changes to status, owners, commit time, area, sub-area, addition of solutions/resolution documents, etc. At block 406, the synchronization service request process synchronizes the target system with the latest updated information from the source system (MAIS) and vice versa by using the service request object.

[0042]   The primary variables of a service request object are: 1) contact, 2) account, 3) asset or product. When the service request is created, the service request is linked to one or more of the above primary variables. Additionally, variables such as severity, area, sub-area, summary, description, etc., may be passed. If the

service request already exists, then the IBP updates all of the service request variables/fields that changed since the last update or creation of the service request. Table 1 summarizes some of aspects associated with the service request object and synchronization service request process.

TABLE 1

Type`	Send
Mode	Asynchronous
Sender Application	MAIS applications, Micromuse, Remedy
Receiver Application	Micromuse, Remedy, MAIS applications
VBC or Data Replication	Data Replication
Primary Actor	Customer Service Representative, Automatic events (Micromuse)
Supporting Actors	Service manager, external (target) applications
Precondition	All Contact, Account, Asset, and Product information that exist in MAIS should be synchronized with external (target) systems and Vice Versa.
Minimal Guarantees	MAIS to external (target) system: A Service request is created in the external system even if Account and Contact details cannot be found. If the service request already exists, then at least the key fields/records such as commit time, Area, Sub-area, Owner, Status,

	activities within a service request, are updated. External (target) system to MAIS: A Service request is created in MAIS even if Account and Contact details cannot be found. If the service request already exists, then at least the key fields/records such as commit time, Area, Sub-area, Owner, Status, activities within a service request, are updated.
Success Guarantees	MAIS to external (target) system: A Service request is created/updated in the external system with all details such as account, contact, activities, etc., populated or updated. External system (target) to MAIS: A Service request is created/updated in MAIS with all details such as account, contact, activities, etc., populated or updated.
Trigger	Information should be sent out after a record is saved in the database
Condition	Area = "Network" if the target application is Micromuse. This should be configurable by the MAIS administrator. No conditions if Remedy is the target application.
Post Step	None
MAIS BO	Service Requests
Package Size	One Service Request and all the relevant details
Master Data Dependencies	Account, Contact, Products, Activities, Assets, Solutions
Remote data requirement	Service Requests should be set in mode "To be submitted" which should happen when users connects to the network
Send	List of Service Requests

	Account Info
	Contact Info
	service request Information (Area, Sub-area, Status, etc.)
	Asset Information
	Product Info
	Activities
	Type, Description, owner, etc.
	Audit Trail
	Info on all changes
Receive Comments	None.

[00104]   Once an service request is created or updated and saved in MAIS, the same information is sent to the external (target) system to create or update the same service request. With respect to the process flow from the external (target) system to MAIS, once a trouble ticket or service request is created or updated in the external (target) system or an event is triggered, information is sent to MAIS to create or update the service request.

[00105]   The Service Request Common Object includes the following information:

•   Service request number: System generated alpha-numeric code that identifies a service request uniquely.

- Account Name: Name of the account that the service request belongs to.

- Site: Location of the account.

- Summary: Brief description of reasons for logging a service request.

- Description: Detailed description or explanation of the customer problems, issues, etc., which requires assistance.

- Contact last name: Last name of the contact that logged the service request.

- Contact first name: First name of the contact that logged the service request.

- Status: Indicates the current status of the service request (Open, Closed, Pending, etc.).

- Sub-status: Indicates the current sub-status of the service request based on the status selected. For example, potential sub-status values could be "Waiting for info", "More info needed", etc., for status = "Open".

- Source: Indicates the channel (Phone, Web, Email, etc.) through which the service request was logged.

- Area: Identifies the category (Hardware, Software, Network support, etc.) that the service request belongs to.

- Sub-area: Identifies the sub-category within a category.

- Priority: Customer's rating or ranking (Very high, High, Medium, etc.) that identifies the degree of customer's importance in resolving the service request.

- Severity: Customer service center's ranking of the service request based on its own assessment.

- Owner: Employee ID of the person that is responsible for resolving the service request.

- Time Opened: System time stamp when the service request was opened.

- Time Closed: System time stamp when the service request was closed.

- Time Committed: Indicates a point in time before which the customer should be responded to in resolving the service request.

- Product: Indicates the product that is associated with the service request.

- Part number: Manufacturer's code for identifying the product associated with the service request.

- Asset number: Internal company code that uniquely identifies the product associated with the service request.

- Profile: List of external products that could have potential interactions with the product identified above.

[00106]   Thus, the service request common object provides a unique, flexible, common data structure to represent various types of service requests for most industries. The service requests can be assigned to any organization, person or business unit. The service request common object also carries information about Parent Area, Sub Area, Product & environment data, Asset Number and Status/Priority codes. List of all activities performed (internal and published) can also be transferred using the service request common object.

[00107]   The service request can be associated with various Contacts, Owners,

Organization. The Service request can also be associated with either Product or Installed Product. Also, environment information can be communicated using External Product and or External Installed product.

[00108] FIG. 5 to FIG. 17 are data structure diagrams of the service request common object model. Such a service request common object model illustrates sample intermediate data structure that can contain information to be synchronized between the source and target systems.

[00109] FIG. 5 is a block diagram that illustrates the components of a service request object as described herein. In FIG. 5, the service request common object includes a list of service request element 502, which in turn includes any number of service request components 504. The service request common object has a basic Type called ServiceRequestType as shown in the following figure. ServiceRequestType contains components of service request common object such as:

Common Id 506;

Base Data 508;

Related parent Area 510;

Related Root area 512;

Related Contract 514;

List of Related Contacts 516;

List of Related Account (Customer) 518;

List of Related Owner 520;

Status Data 522;

Related Product (both Internal and External) 524;

Related Installed Product (Customer Asset) 526;

Related Business Unit 528;

List of Related Activity 530; and

Service request custom data 532.

[00110]   In FIG. 6, the illustrated intermediate data structure 600 is of type service request base data. Base data 602 may include the following components:

- Abstract 604 (summary of requested service);

- Channel source code 606 (e.g. phone, web, email, fax, etc.);

- Closed Date 608 (date when service request is closed);

- Commit time 610 (time before which to respond to the customer for resolving the service request);

- Description 612 (detailed description or explanation of the customer problems, issues, etc., which require assistance);

- Number 614 (service request number); and

- Reported date 616.

[00111]   In FIG. 7, the illustrated intermediate data structure 700 is of type service request related parent area. Service request related parent area 702 includes a parent area component 704, which in turn may include the following components:

- ID 706 (common ID of the functional area);

- Base data 708 that can include a functional area name 714;

- List of related sub-areas 710 that can include any number of related sub-areas 716; and

- Functional area custom data 712.

[00112]   In FIG. 8, the illustrated intermediate data structure 800 is of type service request related root area. Service request related root area 802 includes an ID component 804, which is the common ID of the functional area of the service request.

[00113]   In FIG. 9, the illustrated intermediate data structure 900 is of type service request related contracts. The related contract component 902 may include an ID 904, a related contract base data 906, and a related contract custom data 908. The related contract base data 906 may include the following components:

- Description 910 of the related contract;

- Effective-to date 912 (up to what date is the contract effective);

- · Type code 914 (e.g., field services, service, etc.);

- Number 916 (contract number);

- Effective-from date 918 (from what date is the contract effective);

- Response code 920 (such as support codes, e.g., 24X7, service, e.g., 24X5 service) and

- Response time 922.

[00114]   In FIG. 10, the illustrated intermediate data structure 1000 is of type service request list of related contact. The list of related contact component 1002 may include any number of related contacts 1004. Each related contact may include the following components:

- ID 1006 (common ID of a party);

- Communication data 1008 (communication data for a party);

- Data cleansing data 1010 (i.e., data that is related to data cleansing);

- List of address 1012 (address of a party);

- List of relationship 1014 (relationships that a party can have with other entities);

- List of alternate ID 1016;

- List of License data 1018;

- Custom party data 1020;

- Person base data 1022;

- Privacy data 1024; and

- Custom data 1026 for the related contact.

[00115]   In FIG. 11, the illustrated intermediate data structure 1100 is of type service request list of related account. The list of related account component 1102 may include a related account component 1104, which in turn may include the following components:

- ID 1106 (common ID of a party);

- Communication data 1108 (communication data for a party);

- Data cleansing data 1110 (i.e., data that is related to data cleansing);

- List of address 1112 (address of a party);

- List of relationship 1114 (relationships that a party can have with other entities);

- List of alternate ID 1116;

- List of License data 1118;

- Custom party data 1120;

- Base data 1122; and

- Custom data 1124; and

[00116]   In FIG. 12, the illustrated intermediate data structure 1200 is of type service request list of related owner. The list of related owner component 1202 may include any number of related owners 1204 (assignees of the service request). Each related owner may include the following components:

- ID 1206 (common ID of a party);

- Communication data 1208 (communication data for a party);

- Data cleansing data 1210 (i.e., data that is related to data cleansing);

- List of address 1212 (address of a party);

- List of relationship 1214 (relationships that a party can have with other entities);

- List of alternate ID 1216;

- List of License data 1218;

- Custom party data 1220;

- Person base data 1222;

- Privacy data 1224; and

- Custom data 1226 for the related owner.

[00117]   In FIG. 13, the illustrated intermediate data structure 1300 is of type service request status data. The status data component 1302 may include the following components:

- Priority code 1304;

- Severity code 1306

- Status code 1308; and

- Sub-status code 1310.

[00118]   In FIG. 14, the illustrated intermediate data structure 1400 is of type service request related product. The related product component 1402 may include the following components:

- ID 1404 (product ID);

- Base data 1406 (product base data);

- Sales data 1408 (product sales data);

- Configuration data 1410;

- Related product line 1412;

- List of price type 1414 (collection of valid price types for this product);

- List of related inventory location 1416 (collection of valid inventory locations , e.g. warehouses, plants, that stock this product);

- List of related product 1418;

- List of related business unit 1420 (sales organizations that are authorized to sell this product); and

- Custom data 1422 (product custom data reserved for use by the customer).

[00119]   In FIG. 15, the illustrated intermediate data structure 1500 is of type service request related installed product. The related installed product component 1502 may include the following components:

- ID 1503 (common ID of an installed product);

- Base data 1504;

- Related parent installed Product 1506;

- Pricing data 1508;

- Related product 1510;

- List of related party 1512 (account and owner of the installed product);

- List of related order 1514;

- Related inventory location 1516;

- Related business unit 1518;

- List of attribute 1520;

- Custom data 1522; and

- List of related installed product 1524 (list of related external installed products associated with the installed product on the service request).

[00120] Further, the list of related installed product may include any number of a related external products 1526. Each related external product 1526 may include the following components:

- ID 1528 (product ID);

- Base data 1530 (product base data);

- Sales data 1532 (product sales data);

- Configuration data 1534;

- Related product line 1536;

- List of price type 1538 (collection of valid price types for this product);

- List of related inventory location 1540 (collection of valid inventory locations , e.g. warehouses, plants, that stock this product);

- List of related product 1542;

- List of related business unit 1544 (sales organizations that are authorized to sell this product); and

- Custom data 1546 (product custom data reserved for use by the customer).

[00121] In FIG. 16, the illustrated intermediate data structure 1600 is of type service request related business unit. Service request related business unit 1602 includes an ID component 1604.

[00122]   In FIG. 17, the illustrated intermediate data structure 1700 is of type service request list of related activity. The list of related activity component 1702 may include any number of related activities 1704. Each related activity component may include the following components:

- Access code 1706 (e.g., private, audience, internal, etc.);

- Comment 1708 (additional comments on action taken);

- Duration 1710 (e.g., count, day, hour, etc.);

- End date 1712;

- Number 1714 (activity number);

- Reason code 1716 (e.g., quality, defect, scheduled maintenance, un-scheduled maintenance, etc.);

- Start date 1718;

- Task description 1720 (description of action taken);

- Type code 1722 (category of work, e.g., meeting, admin, etc.); and

- Related owner 1705.

[00123]   It will be appreciated by those skilled in the art that the above-described facility may be straightforwardly adapted or extended in various ways. For example, the facility may be used to transform various other kinds of service request information, and may be used to transform service request information between a variety of other formats.

[00124]   In the foregoing specification, embodiments of the invention have been described with reference to numerous specific details that may vary from

implementation to implementation. Thus, the sole and exclusive indicator of what is the invention, and is intended by the applicants to be the invention, is the set of claims that issue from this application, in the specific form in which such claims issue, including any subsequent correction. Any express definitions set forth herein for terms contained in such claims shall govern the meaning of such terms as used in the claims. Hence, no limitation, element, property, feature, advantage or attribute that is not expressly recited in a claim should limit the scope of such claim in any way. The specification and drawings are, accordingly, to be regarded in an illustrative rather than a restrictive sense.